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**Datasheet for the decision  
of 23 June 2023**

**Case Number:** T 1249/20 - 3.3.03

**Application Number:** 13834844.6

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C08F236/10

**Language of the proceedings:** EN

**Title of invention:**  
RUBBER COMPOSITION FOR TIRES, TIRE MEMBER, AND PNEUMATIC TIRE

**Patent Proprietor:**  
Sumitomo Rubber Industries, Ltd.

**Opponent:**  
Compagnie Générale des Etablissements Michelin

**Relevant legal provisions:**  
EPC R. 99(2)  
EPC Art. 56, 111(1)  
RPBA 2020 Art. 11

**Keyword:**

Admissibility of appeal (yes)

Inventive step of claim request underlying the contested  
decision (no) - obvious modification

Remittal (yes) special reasons for remittal

**Decisions cited:**

T 0939/92



**Beschwerdekammern**

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**Case Number: T 1249/20 - 3.3.03**

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 23 June 2023**

**Appellant:** Compagnie Générale des Etablissements Michelin  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
19 March 2020 concerning maintenance of the  
European Patent No. 2883909 in amended form.**

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** F. Rousseau  
F. Bostedt

## Summary of Facts and Submissions

I. The appeal lies from the interlocutory decision of the opposition division according to which European patent No. 2 883 909 as amended according to the claims of auxiliary request 1 submitted during the oral proceedings on 15 January 2020 and a description adapted thereto met the requirements of the EPC.

II. Claim 1 of auxiliary request 1 read as follows:

"1. A method of producing a rubber composition for tires, the method comprising:

a step (A) of preparing butadiene by a catalytic reaction from at least one biomass-derived ingredient selected from the group consisting of biomass-derived alkyl alcohols, alkenes, and unsaturated carboxylic acids;

a step (B) of preparing styrene using at least one selected from the group consisting of microorganisms, plants, and tissue cultures thereof; and

a step (C) of polymerizing the butadiene prepared in the step (A) and the styrene prepared in the step (B) to prepare a biomass-derived styrene-butadiene rubber having a pMC (percent modern carbon) measured in accordance with ASTM D 6866-10 of 1% or higher,

wherein the styrene is directly produced from biomass by at least one selected from the group consisting of microorganisms, plants, and tissue cultures thereof."

III. The decision was taken having regard to the following documentary evidence amongst others:

D1: JP 2012-153654 and machine translation thereof in English D1t

D2: WO 2010/099201 A1

D3: WO 2011/085223 A1

D4: WO 2010/053950 A2

D5: R. McKenna et al, "Styrene biosynthesis from glucose by engineered *E. coli*", *Metabolic Engineering*, 2011, Vol. 13, (2011) pages 544-554

D7: WO 2012/018624 A2

D9: Xavier Fernandez et al, "Chemical composition of the essential oils from Turkish and Honduras Styrax", *Flavour and Fragrance Journal*, 2005, Vol. 20, pages 70-73

D10: W.M. Groenewoud, "Characterization of Polymers by Thermal Analysis", Elsevier, 2003, pages 17-25

D11: JP 2003-63206 and machine translation in English thereof D11t

D20: WO 2011/1120966 A1

IV. According to the reasons for the contested decision which are pertinent for the appeal proceedings:

(a) D20 was admitted into the proceedings.

(b) The requirements of Article 123(2) EPC were met as claims 1, 5 and 20 and the information of paragraphs [0014] and [0173] provided sufficient basis for amended claim 1.

(c) Regarding inventive step of the subject-matter of auxiliary request 1, the closest prior art was represented by D1, since it described the replacing of fossil fuels with biomass resources.

(d) The method of claim 1 was distinguished from the disclosure of D1 in that the styrene was directly produced from biomass by at least one selected from the group consisting of microorganisms, plants, and tissue cultures thereof instead of being indirectly obtained, as disclosed in D1.

(e) The objective technical problem solved by the method of claim 1 was the provision of an alternative method for producing a rubber composition for tyres having good wet grip performance and good rolling resistance comprising a styrene/butadiene rubber having a high pMC value by using styrene monomers from a biomass source instead of the indirect method described in D1.

(f) Although D4, D5, D7 or D9 described the direct synthesis of styrene from a biomass source, none of these documents related to the field of tyres. Thus, the skilled person working in the field of tyres would not have considered the teaching of these documents when looking for an alternative method for the production of styrene monomers. Any other conclusion would be based on hindsight.

(g) An inventive step was therefore acknowledged.

V. An appeal against that decision was lodged by the opponent (appellant) and a statement setting out the grounds of appeal was submitted.

VI. A reply to the statement of grounds of appeal dated 2 October 2020 was filed by the patent proprietor (respondent) to which ten sets of claims labelled auxiliary requests 2 to 11 were attached. Compared to

auxiliary request 1, auxiliary requests 2 additionally defines that the biomass-derived styrene-butadiene rubber has a glass transition temperature (T<sub>g</sub>) measured according to JIS-K 7121 of -60°C or higher. The amendments contained in the other auxiliary requests are not relevant for the present decision.

- VII. Oral proceedings before the Board were held on 23 June 2023.
- VIII. The parties' submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. The contentious point essentially concerned the question whether the claimed method involved an inventive step over the disclosure of D1, while the respondent considered, contrary to the appellant, that the closest prior art was not represented by D1, but by D11.
- IX. As their final requests the appellant requested that the decision under appeal be set aside and that the patent be revoked, and that the case not be remitted to the opposition division for further prosecution.
- X. As their final requests, the respondent requested that the appeal be rejected as inadmissible, in the alternative, that the appeal be dismissed or, in a further alternative, that the case be remitted to the opposition division for further prosecution.

## **Reasons for the Decision**

### *Admissibility of the appeal*

1. In the respondent's opinion, a causal relationship between the arguments in the statement of grounds of appeal and the reasons given in the decision under appeal was missing which would result in the appeal to be inadmissible.
  - 1.1 According to Rule 99(2) EPC, in the statement of grounds of appeal the appellant must indicate the reasons for setting aside the decision impugned, or the extent to which it is to be amended.

The reasons given in the contested decision address the question of an extension of the subject-matter beyond the content of the application as filed and the ground for opposition of lack of an inventive step (see point IV, above). Regarding the requirements of Article 123(2) EPC, the respondent's opinion is that the appellant did not address in its statement of grounds of appeal the change of claim category. However, having regard to section III-1-d)iv) of the statement of grounds of appeal (pages 10 and 11), this is incorrect. Moreover, the respondent admits that this point, even it was addressed in a communication of the opposition division, is not dealt with in the reasons for the contested decision (rejoinder, paragraph bridging pages 2 and 3). This in itself establishes that there is not a lack of a causal relationship between the arguments in the statement of grounds of appeal and the reasons given in the decision under appeal and that reasons



have been indicated for setting aside the decision impugned in accordance with the requirement of Rule 99(2) EPC.

Moreover, the opposition division's reasoning on the allowability of the amendment is based on a single statement, namely that amended claim 1 is based on a combination of claims 1, 5 and 20 and the information of paragraphs [0014] and [0173] of the application as filed, with a reference to the passages of the application in its A1 published version. No indication is given in the reasons for the decision as to the significance of these passages and as to why they should be understood by the skilled person as necessarily being read in combination so as to provide a direct and unambiguous disclosure for the subject-matter of claim 1.

During the oral proceedings before the opposition division, the appellant referred in relation to auxiliary request 1 to its arguments provided in respect of the main request. These submissions relied on the assertion that multiple choices within the alternatives taught in the application as filed were needed to arrive at the claimed subject-matter. These arguments, which were not dealt with in the reasons for the contested decision, have been addressed at length by the appellant on pages 7 to 9 of the statement of grounds of appeal. Therefore, also in this respect there is a causal relationship between the arguments in the statement of grounds of appeal and the reasons given in the decision under appeal and, therefore, reasons have been indicated for setting aside the decision impugned in accordance with the requirement of Rule 99(2) EPC.

There is no need to consider the respondent's further arguments as to whether a "causal link" has been established in relation to further issues addressed on appeal, as the above is sufficient for the appeal to be admissible. However, such a "causal link" also exists in relation to the question of inventive step. The appellant provides detailed arguments, amongst others, as to why the skilled person would consider documents D4, D7 or D9 in order to solve the established objective problem, despite the fact that they did not relate to the field of tyres (sections II-2-a-f) on pages 16 to 19 of the statement of grounds). This specific point is an answer to the opposition division's position which considered that the the skilled person working in the field of tyres would not consider the teaching of these documents when looking for an alternative method for the production of styrene monomers.

1.2 The respondent also requests that the following questions be referred to the Enlarged Board of Appeal (page 5 of the rejoinder to the statement of grounds):

"a) Admissibility of an appeal requires according to the established case law of the boards of appeal that a causal link is made between the grounds of appeal and the decision under appeal. Is it possible to establish such a causal link between the reasons in a decision under appeal by presenting new arguments that were not part of the opposition proceedings?

b) In case the answer to question a) is "yes", does the answer change when these new arguments are inadmissible, since there is no reason why they were not presented during first instance proceedings?"

The alleged new argument of the appellant, which is the basis for the proposed questions, refers to the nature of the skilled person (rejoinder, first paragraph of page 4) and the admittance of this argument is disputed.

The Board does not see any necessity to refer these or similar questions to the Enlarged Board, since a "causal link" is already given on other grounds, as set out above, so that an answer to such questions is not decisive for the outcome of the present case.

Moreover, the admissibility of the appeal and the admittance of new submissions on appeal which relate to the merits of the appeal are separate issues, governed by different legal provisions with distinct requirements. In particular, the admissibility of the appeal is regulated in Articles 106 to 108 and Rules 97 and 99 EPC (see Rule 101(1) EPC) while the admittance of submissions on appeal is governed by the RPBA 2020, in particular their Articles 12 and 13. Thus, in general terms, the admissibility of the appeal is to be decided on what was presented in the notice of appeal and the statement setting out the grounds of appeal; the question of whether the submissions made therein also include new facts, evidence, objections and arguments and may for this reason not be admitted into the appeal proceedings is to be decided separately and has no bearing on the question of whether the appeal is admissible.

This is reflected in the explanatory remarks in the table setting out the amendments to the RPBA (remark concerning Article 12(4) RPBA 2020, supplementary publication 2, OJ EPO 2020, page 56): *"For the avoidance of doubt, it should be noted that the*

*admissibility of the appeal continues to be examined on the basis of all the documents filed by the appellant at this stage, even if they are not admitted under this paragraph for the purpose of examining the merits of the appeal".*

- 1.3 On that basis the request of the respondent of referral to the Enlarged Board of Appeal is rejected and the appeal is admissible.

*Inventive step*

*Closest prior art*

2. Contrary to the contested decision and the appellant's position, the respondent considers that the closest prior art is not represented by D1, but by D11.
  - 2.1 D11 is cited in paragraphs [0005] and [0010] of the patent in suit as background art to the present invention. D11 is said in paragraph [0005] to use natural rubber, which is reported in paragraph [0006] to be inferior to synthetic rubber such as SBR in terms of fuel efficiency, wet grip performance, and processability.

Thus, according to paragraph [0011] of the patent in suit, the object of the invention was to provide rubber compositions for tyres capable of providing tyre components and pneumatic tyres that have the same level of fuel efficiency and wet grip performance as those of tyre components and pneumatic tyres containing conventional synthetic rubber, while satisfying the requirements for a sound material-cycle society.

The expression "*a sound material-cycle society*" is first to be found in paragraph [0004] of the patent in suit. This paragraph reads: "*Hence, the people's desire to construct a sound material-cycle society has recently become stronger. Accordingly, there is a need for a departure from fossil fuel dependence in the material field as well as in the energy field, and the use of biomass has been focused on*". It is unambiguous from this passage that "*a sound material-cycle society*" refers to the need to depart from fossil fuel dependence, which is in line with the two preceding paragraphs addressing the high content of petroleum-derived raw materials in tyres, the limited resources for petroleum-derived raw materials and the increasing restrictions concerning CO<sub>2</sub> emissions. This is in agreement with the rest of the specification in which the focus is made on providing a biomass-derived styrene-butadiene rubber.

Moreover, the expression "*a sound material-cycle society*" is not indicated in the patent in suit to refer to the more general need to save energy and resources, such as water. For this reason, the respondent's argument that the Friedel-Craft chemistry described for the preparation of styrene in D1 which is extremely water sensitive and requires high temperatures would not be in accordance with "*a sound material-society*" and that the skilled person would therefore be deterred from starting from D1 is not convincing.

2.2 Furthermore, it is uncontested that D1 describes in table 1 a rubber composition for tyres which comprises a solution polymerised biomass based SBR and an emulsion polymerised biomass based SBR (paragraphs [0093] to [0099]).

D1 describes in its paragraph [0094] that the butadiene is prepared by a catalytic reaction of bioethanol, i.e. by a preparation of butadiene in accordance with step (A) of operative claim 1.

Moreover, the biomass based styrene obtainable by step (B) of operative claim 1 is not distinguishable from the biomass based styrene prepared according to the method of D1 using as reactants benzene and ethylene, both prepared from bioethanol (paragraphs [0093]).

Accordingly, step (C) defined in operative claim 1, which merely requires polymerisation of the butadiene prepared in step (A) and the styrene prepared in step (B), does not constitute a distinguishing feature over the closest prior art, contrary to the respondent's contention (rejoinder, page 30, first sentence of section a)).

In addition, it is also undisputed that the tyre composition obtainable by the method of operative claim 1 is indistinguishable from the tyre composition obtained by the method defined in D1, i.e. the SBR obtainable by steps (A) to (C) of method of operative claim 1 is not distinguishable from the SBR obtained in D1.

- 2.3 The respondent's argument that the choice of D1 as the closest prior art is based on hindsight, since D1 would not address the problem of fuel efficiency, wet grip performance and processability, is also not convincing. Rolling resistance, which is known to be related to fuel efficiency, and wet grip are relevant properties explicitly addressed in D1 (paragraphs [0108], [0109] and [0112]). Accordingly, having also regard to the

aspect of the object of the invention defined in paragraph [0011] of the patent in suit relating to the performances of the tyre, the skilled person would rather start from the teaching of D1 which concerns the use of SBR in a composition for tyres than from the teaching of D11 which concerns a composition using NR instead of SBR.

- 2.4 On this basis, D1 represents in view of the goals of the invention set out in the patent in suit a realistic starting point for the present invention. Even if - to the benefit of the respondent - D11 were considered to represent an additional conceivable starting point for the present invention, because that document aims at replacing all compounds based on fossil sources for the production of tyres, it is settled case law that the rationale of the problem and solution approach requires that inventive step be assessed relative to all possible realistic routes for the claimed invention, before an inventive step can be acknowledged (Case Law of the Boards of Appeal of the EPO, 10th edition 2022, I.D.3.1). Under these circumstances, it is legitimate to assess inventive step starting first from the disclosure of D1 taken as the closest prior art when applying the problem solution approach.

*Distinguishing feature(s)*

3. Having regard to point 2.2 above, the only distinguishing feature of operative claim 1 over the disclosure of D1 is step (B), i.e. the direct preparation of styrene from biomass by at least one selected from the group consisting of microorganisms, plants, and tissue cultures thereof.

It is at this juncture useful to indicate that, as was not disputed by the parties, a direct method within the meaning of the patent in suit is a method in which the microorganisms, plants, and tissue cultures thereof directly produce styrene, in contrast to the method described in D1 in which an intermediate produced from biomass resources needs to be chemically transformed in order to obtain styrene.

*Problem successfully solved and solution*

4. Having regard to the disclosure of the closest prior art, the appellant and the respondent take differing positions as to which problem can be considered successfully solved by the method of operative claim 1.
- 4.1 The respondent argues that the technical problem solved by the method of claim 1 with respect to the closest prior art is "*the provision of a method for producing a rubber composition for a pneumatic tire having good wet grip performance and good rolling resistance which helps achieving a sound material-cycle society*". In the respondent's opinion, the expression "*a sound material-cycle society*" also implies that the preparation of the rubber composition itself is less resource consuming, also taking into account the energy required for such preparation, i.e. a preparation method which is less resource consuming than the production of the rubber composition according to D1, which relies on Friedel-Crafts based chemistry using high temperature feeding streams and dry organic solvents.

The appellant considers that the problem solved, in the absence of any technical effect linked to the distinguishing feature identified in point 3 above, is the provision of an alternative route for the provision



of a rubber composition as described in D1 using biomass.

- 4.2 The part of the problem formulated by the respondent relating to the properties of the tyre is not accepted for the following reasons.

Firstly, in accordance with the problem solution approach, the problem is to be defined as that solved over or in comparison with the closest prior art, e.g. in terms of technical effects brought about by the feature(s) distinguishing the claimed subject-matter from the closest prior art. It is uncontested that the distinguishing feature identified in point 3 above, which concerns a way of producing styrene different from the one described in D1, does not lead to a different rubber composition and therefore cannot be the cause for any advantage relating to the properties of the rubber composition obtainable by the method of operative claim 1.

Secondly, operative claim 1 does not define any component of the tyre composition other than the SBR, whereas it is well known in the art that the achievement of good wet grip performance and good rolling resistance depends on the various components of the tyre composition and not only on the SBR, whose amount is not even specified in claim 1.

- 4.3 The Board does also not accept the respondent's allegation that the method of preparing styrene defined in step (B) and thus the method defined in claim 1 is less energy and resource consuming than the method set out in the closest prior art.

Concerning the preparation of styrene defined for step

(B) of operative claim 1, namely using at least one selected from the group consisting of microorganisms, plants, and tissue cultures thereof, the respondent who carries the burden of proof for the facts it alleges (Case Law, *supra*, III.G.5.1.1 and III.G.5.1.2 b)), did not provide any evidence that the preparation of styrene using the method defined in step (B) of operative claim 1 is less resource consuming than the production of styrene in D1 using the Friedel-Crafts based chemistry; the respondent did also not provide any explanations rendering this allegation credible. The claims themselves are not limited by any specific measures concerning these methods of preparing styrene, i.e. their mere designation does not necessarily imply or at least suggest a lower consumption of resources and energy in comparison to the method of D1 based on Friedel-Crafts chemistry.

In addition, the examples describing the production of styrene in the experimental part of the specification do not give any indication that this would be the case. As pointed out by the appellant, preparation example 9 of the patent in suit which concerns the preparation of styrene with genetically modified *Escherichia coli* results in 140 mg of styrene present in one liter of hexane (paragraph [0240]), which solvent needs to be removed. As to the preparation of styrene from the trees of the family *Hamamelidaceae* or of the family *Styracaceae* shown in preparation examples 5 and 6, respectively, it leads for about 600 g of collected tree resin to only 0.8 g or 0.1 g styrene, respectively (paragraphs [0223] and [0224]), which preparation necessitates to immerse the collected resin in toluene and distillate the toluene solution obtained after a filtration step. Having regard to such a large proportion of solvent relative to the amount of styrene

isolated, the examples of the patent in suit cast doubt onto whether the direct methods as defined in operative claim 1 necessarily solves the problem of "*helping achieving a sound material-cycle society*", even if this expression is understood to relate to the general need to save energy and resources, such as water, as was contended by the respondent.

Therefore, in the absence of any substantiating facts and corroborating evidence, the Board considers the respondent's allegation that the method of preparing styrene defined in step (B) and accordingly the method defined in claim 1 is less energy and resource consuming than the method of the closest prior art as a mere assertion. Therefore, the advantages in terms of the process contended by the respondent cannot be accepted either and taken into account for the formulation of the problem successfully solved over the closest prior art (Case Law, *supra*, I.D.4.3.1).

- 4.4 Accordingly, the problem successfully solved by the subject-matter of claim 1 over the closest prior needs to be formulated, along the line suggested by the appellant, as the provision of a further method using biomass for producing a composition for tyres.
- 4.5 The solution claimed resides in the method according to operative claim 1 that differs from the one of D1 only in that styrene used for the production of the SBR is directly prepared from biomass by microorganisms, plants, and tissue cultures thereof (point 3 above).

*Obviousness of the solution*

5. It remains to be decided whether, in view of the disclosure of D1 and possibly in combination with other

prior art documents or common general knowledge, the skilled person desiring to solve the above problem would have modified the method of D1 in such a way as to arrive at the method of operative claim 1. Concerning the direct preparation of styrene by microorganisms, the appellant referred to documents D4, D5 and D7.

5.1 The aim of the invention described in D4 is to find alternative feedstock sources for the production of important chemicals for industry, e.g., styrene, which are traditionally produced from petroleum (paragraphs [0003] and [0007]). D4 describes the direct production of styrene with a microorganism (claim 1), e.g. with *Fusarium oxysporum* using potato dextrose broth (examples 4 and 5 on pages 22 to 24).

D5 aims at the engineering of a biocatalyst capable of synthesising styrene from renewable resources as a more sustainable and greener source of styrene and styrene-derived polymers from petroleum (introduction, first paragraph). It describes the microbial direct styrene production from biomass such as glucose using a genetically modified microorganism (*Escherichia coli*) (abstract; page 545, figure 1).

D7 generally relates to biosynthetic processes, in particular to organisms having biosynthetic capability for producing various chemicals, including styrene (page 1, first paragraph; page 3, last paragraph before the section "summary of the invention"; claim 35; Figure 3; page 9, first and second paragraph of the section "detailed description of the invention"; page 21, first and second full paragraphs), the growth medium including biomass (page 71, second full paragraph). The implicit overall aim of D7 is also to

achieve more sustainable chemical production processes (page 1, second and third paragraphs; page 2, second and third full paragraphs).

- 5.2 As illustrated by D1 itself (paragraphs 25, 46 and 56 to 58), the skilled person concerned with the production of tyres is also aware that the use of fossil resources in the manufacture of chemicals and rubbers for the production of tyres, such as styrene-butadiene rubber, can be reduced by using biomass. In D1, the reactants used for preparing the SBR for tyres are ethylene and styrene, both derived from bioethanol (point 2.2 above).

Accordingly, it would be obvious for the person skilled in the art, faced with the problem defined in point 4.4 above, to look for alternative ways of producing some of the components of the rubber compositions for tyres using biomass.

As the specific question does not concern the production of tyres *per se* but rather the production of chemicals using biomass, the person skilled in the art would be prompted to consult a person having knowledge in this matter and as a result the teaching of D4, D5 and D7.

The central argument of the contested decision that the skilled person working in the field of tyres would not have considered the teaching of D4, D5 or D7 is for the above reasons not convincing.

- 5.3 As indicated in point 5.1 above, D4, D5 and D7 teach the skilled person the direct preparation of styrene by microorganisms. Furthermore, the skilled person would find in D4 (paragraphs [0078] to [0085]) the

information that the direct production of styrene on an industrial scale is possible with *Fusarium oxysporum*.

Accordingly, the respondent's argument that none of D4, D5 and D7 discloses a process that appears to be scalable to industrial scale is not persuasive, all the more so since step (B) of operative claim 1 does not contain any feature concerning measures for a production on an industrial level and none of the examples of the patent in suit relate to the preparation of styrene using an industrial method.

With reference to D1 (paragraph [0005]), D2 (page 2, lines 15-20) and D3 (page 5, lines 23 to 24), the respondent similarly submitted that there was at the priority date of the patent in suit a technological prejudice that biological processes were not suitable for producing styrene for industry scale purposes. However, for a prejudice to be considered to exist, there must be a prevailing but incorrect school of thought widespread throughout the entire technical field. A solution put forward as overcoming a prejudice must clash with the prevailing teaching of experts in the field (Case Law, supra, I.D.10.2). Having regard to D4 describing the direct production of styrene on an industrial scale with *Fusarium oxysporum* such a prejudice did not exist. Furthermore, by not defining in operative claim 1 any measure for a production of styrene on an industrial level, the respondent is deemed to accept the drawbacks resulting from the absence of measures necessary for an industrial scale production. This cannot support the existence of an inventive step.

- 5.4 Relying upon the second paragraph of page 2 of D7, the respondent also submits that the skilled person who

follows the teaching of D7 would not leave the preparation of butadiene as it is in D1, i.e. by using in accordance with step (A) of operative claim 1 an indirect preparation for this compound. The skilled person would rather opt not only for styrene, but also for butadiene, for a direct preparation using microorganisms, in line with the general focus of D7 to provide microorganisms having biosynthetic capability, among others microorganisms having biosynthetic capability for styrene or 1,3-butadiene, as such direct preparation of 1,3-butadiene is advantageous (page 2 of D7, second full paragraph).

This is also not convincing.

Given the established principle that the answer to the question as to what a person skilled in the art would have done depends on the result he wished to obtain (T 939/92, OJ EPO 1996, 309, point 2.5.3 of the Reasons), the fact that, in the present case, the skilled person is deemed to be merely seeking to provide a further method using biomass for producing a composition for tyres, i.e. regardless of possible disadvantages inherent to such method, keeping an indirect production of butadiene for the preparation of the biomass-derived styrene-butadiene is considered by the skilled person as a useful and obvious measure. In other words, the skilled person is merely accepting known disadvantages linked to the use of such an indirect method of preparing butadiene, which cannot confer any inventive character to the method of operative claim 1.

- 5.5 Consequently, starting from the teaching of D1 and faced with the problem identified in point 4.4 above, the person skilled in the art would have been prompted

to modify the synthesis of styrene used in D1 and replace it by a direct production from biomass by the microorganisms taught in documents D4, D5 and D7 arriving thereby in an obvious way at a method falling within the ambit of operative claim 1.

- 5.6 The respondent also pointed out in their letter of 13 June 2023 (page 4, first full paragraph) that the direct extraction of styrene as defined in operative claim 1 resulted in a substantial simplification of the process of D1 relying on the conversion of bioethanol to benzene, which in turn needed to undergo a Friedel-Crafts-alkylation with ethylene to give ethyl benzene, which then had to be subjected to dehydrogenation to yield styrene. Moreover, the Friedel-Crafts chemistry of D1 posed difficulties with regard to both safety and waste disposal. On the other hand, the direct synthesis of styrene as defined in claim 1 obviated the use of hazardous, corrosive, and unstable materials, and was therefore much easier to handle. At the oral proceedings that argument was not anymore pursued. Also, the formulation of the problem offered by the respondent during the oral proceedings did not include any longer the provision of a method which is also easier to realize compared to Friedel-Crafts based chemistry or chemistry relying on high temperature feeding streams, as was originally submitted in the reply to the statement of grounds of appeal (page 31, last paragraph).

In any event, these respective disadvantages and advantages of the method used in D1 and of the direct preparation from biomass by microorganisms for producing styrene which have been invoked by the respondent were known to the skilled person. They do not correspond to new aspects of these methods



discovered by the present inventors. Accordingly, even if one considered these additional arguments or aspects of the problem formulation into account, it would still be obvious for the skilled person to arrive at the claimed solution by using the more advantageous direct production of styrene from biomass by microorganisms described in D4, D5 and D7.

6. The subject-matter of claim 1 of auxiliary request 1 therefore does not involve an inventive step within the meaning of Article 56 EPC with the consequence that this request is not allowable.

*Remittal*

7. Since the objection of inventive step under Article 56 EPC, which the opposition division had rejected, prejudices maintenance of the patent on the basis of auxiliary request 1, the impugned decision is to be set aside. The appellant objects that the amendments introduced in auxiliary request 2 do not meet the requirements of Article 123(2) EPC and furthermore do not overcome the above negative finding in respect of inventive step. As to the analysis of these objections, the respondent requests that the case be remitted to the opposition division, while the appellant requests that the Board in exercise of its discretion pursuant to Article 111(1) EPC decide on the issues.
8. Article 11 RPBA 2020 provides that the Board shall not remit a case to the department whose decision was appealed for further prosecution, unless special reasons present themselves for doing so. Whether "special reasons" present themselves is to be decided on a case-by-case basis (see explanatory remarks on Article 11 RPBA 2020, Supplementary publication 2, OJ

2020). This provision has also to be read in conjunction with Article 12(2) RPBA 2020, which provides that it is the primary object of the appeal proceedings to review the decision under appeal in a judicial manner.

A method as defined in claim 1 of auxiliary request 2 was not examined by the opposition division. Whereas the issue of inventive step issue debated during the oral proceeding and decided upon by the opposition division in relation to auxiliary request 1 concerned exclusively a process feature for the production of the biomass-derived styrene-butadiene rubber, the issue to be decided in respect of auxiliary request 2 concerns a physical property of said biomass-derived styrene-butadiene rubber, namely its glass transition temperature. In this respect, it would need to be determined first whether it constitutes an additional distinguishing feature over the closest prior art, which is a contentious point between the parties based on submissions relying on additional evidence D10 and D20, which had not been debated, let alone decided at the oral proceedings before the opposition division. In addition, the issue of whether that amendment results in claim 1 to extend the claimed subject-matter beyond the content of application as filed is an additional point in dispute between the parties not considered and not decided upon by the opposition division. This situation is seen by the Board to constitute "special reasons" within the meaning of Article 11 RPBA 2020 which justify remittal of the case for further prosecution to the department whose decision was appealed.

Accordingly, exercising its discretion under Article 111(1), second sentence, EPC, the Board decides to

remit the case to the opposition division for further prosecution.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division for further prosecution.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated